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THE AGE OF THE CRETACEOUS FLORA OF SOUTHERN NEW YORK AND NEW ENGLAND

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The age of the plant-containing Upper Cretaceous which outcrops, or is found in morainal deposits, on Staten Island, along the north shore of Long Island, and on Block Island and Martha's Vineyard has never been exactly determined, although their obvious general relations may be indicated by the fact that as early as 1838 Mather[1] suggested their equivalency with the New Jersey beds around Raritan Bay.

Only one or two points in the history of their study need be mentioned. Newberry considered them the equivalent of the Amboy clays which as then developed paleobotanically were almost entirely Raritan. Ward[2] named them the Island series and considered them uppermost Potomac but post-Raritan, the latter being erroneously regarded as of late Lower Cretaceous age.[3] White,[4] who was the first to prove the existence of Upper Cretaceous on Martha's Vineyard is quoted by Veatch (1906) as holding that the plant beds on that island are about equivalent to those at Cliffwood, New Jersey, an undoubtedly correct interpretation.

It was not until the Magothy formation was delimited from the underlying Raritan formation and the overlying Matawan formation by Clark[5] in 1904 and its flora described by the writer[6] that adequate paleobotanical data were available for exact comparisons with the more or less isolated and disturbed outcrops to the eastward.

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[1] W. W. Mather, *Rept. First Dist. N.Y.* (1838), pp. 136-37.

[2] Lester F. Ward, *Fifteenth Ann. Rept. U.S. Geol. Surv.* (1895), p. 335.

[3] It is not worth while to consider the claim of O. C. Marsh that these beds represent Jurassic sediments.

[4] D. White, *Am. Jour. Sci.* (III), XXXIX (1890), 93-101.

[5] W. B. Clark, *Am. Jour. Sci.* (IV), XVIII (1904), 435-40.

[6] E. W. Berry, *Ann. Rept. State Geol. N.J. for 1905*, pp. 135-56.

In the last few years the geology of Long Island has been studied by Veatch,[1] Fuller,[2] and others, and the southward extensions of the Raritan and Magothy floras across New Jersey and in Delaware and Maryland have been investigated by the writer.[3] From the strike of the Cretaceous beds across Long Island as determined by the authors above mentioned; by a study of their lithology and genesis; and by an analysis of the insular floras, for a knowledge of which we are indebted almost entirely to the long-continued labors of Dr. Arthur Hollick,[4] it is now possible to determine with certainty the age of a number of the localities where Cretaceous plants have been found and to show with a fair degree of probability the age of the original deposits from which the more outlying morainal-materials-carrying plants have been derived.

Without burdening the reader with the steps in this analysis, the conclusions at which the writer has arrived will be given, and a list of the Raritan and Magothy floras will be appended, so that the following statements can be verified by anyone that cares to take the trouble to do so.

The beds on Staten Island offer little difficulty, since they are practically continuous with those of New Jersey; in fact Hollick has indicated in several publications that the celebrated Kreischerville outcrops are of Raritan age. From clays in place plants have been collected at Green Ridge and around Kreischerville. From morainal material Upper Cretaceous plants are recorded from Tottenville, Richmond Valley, Princess Bay, and Arrochar. These also are probably all of Raritan age.

Along the north shore of Long Island fossil plants have been collected from clays in place at Glen Cove, Cold Spring, and Northport. From the geographical position of these outcrops, their distance above bedrock, and as is conclusively shown by their extensive flora, they are unquestionably of Magothy age. Fossil plants have been found in morainal materials at a large number of localities on Long Island. These are Brooklyn, Elm Point (Great Neck), Mott Point (Manhasset Neck), Glen Cove, Sea Cliff, Dosoris Island, Lloyd Neck, Eaton's Neck, Roslyn, Oak Neck, and Montauk Point.

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[1] A. C. Veatch, *Professional Paper No. 44, U.S. Geol. Surv.*, 1906.

[2] M. L. Fuller, *Professional Paper No. 82, U.S. Geol. Surv.*, 1914.

[3] E. W. Berry, Contributions to the Mesozoic Flora of the Atlantic Coastal Plains: I, *Bull. Torrey Bot. Club*, XXXIII (1906), 163–82, pls. 7–9; IV, *Ibid.*, XXXVII (1910), 19–29, pl. 8; VII, *Ibid.*, XXXVIII (1911), 399–424, pls. 18, 19; X, *Ibid.*, XLI (1914), 295–300.

[4] Nearly all the literature is summarized by him in *Mon. U.S. Geol. Surv.* (1906), L, since which date only a few minor papers have been published.

While it is quite possible that some of these materials may have been derived from Raritan outcrops once present to the northward, the flora does not indicate Raritan affinities. Of the 100 species listed from Long Island in *Monograph 50* (*op. cit.*), only 33 have been found in the New Jersey Raritan, which is about the same proportion that survives from the Raritan into the overlying Magothy formation in the New Jersey area. There is then no paleobotanical evidence of the existence of the Raritan east of Brooklyn.

The probable genesis of the Raritan has an important bearing on this question. The Raritan formation in the area of its type development (i.e., around Raritan Bay, New Jersey, the so-called Amboy district) consists of a lower, middle, and upper horizon with thick, argillaceous beds, separated by well-defined sand beds from 35 to 50 feet in thickness. The Raritan fire and potter's clay at the base is about 35 feet thick. The middle or Woodbridge clays range from 30 to 60 feet in thickness, while the upper clays (South Amboy fireclay and stoneware clay) are about 50 feet in thickness. These all carry fossil plants. In discussing this flora the writer has demonstrated[1] that it shows a remarkable cleavage into an older flora (Lower and Middle Raritan) and a younger flora (Upper Raritan), from the latter of which a large number of the forms common to the Magothy take their origin. In tracing the Raritan southwestward across New Jersey, Delaware, and Maryland to the Potomac River valley it has been found impossible to recognize the well-marked divisions described in the Amboy district. The massive clays of the latter are replaced within a dozen miles by prevailingly arenaceous deposits, and with the exception of certain well records, e.g., Fort Dupont, Delaware, which are open to various interpretations, the formation is everywhere much thinner. This is capable of more than one explanation, but from a consideration of all the facts it seems probable that at least the older Raritan, that is to say the Lower and Middle Raritan of the Amboy district from the base to the top of the Woodbridge clays, the upper surface of which shows considerable erosion, is a purely local deposit continental or estuarine in character, and that the southwesterly extension of the Raritan represents the Upper Raritan. In endeavoring to trace the Raritan eastward beyond Staten Island one searches in vain in the very numerous well records (Veatch listed over 900 in 1906) for the representatives of the Raritan, Woodbridge, and Amboy clays, the basal beds of the coastal plain in the eastern area being prevailingly sandy with irregular clay lenses of no great extent. This together with the paleobotanical evidence leads to the conclusion that the Lower and Middle Raritan were never present east of Brooklyn, and that while the Upper Raritan may have extended eastward as it did to to the southwestward there is at present no evidence of such an extension. If the Long Island Cretaceous were Upper Raritan, the described floras are extensive enough to determine this point.

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[1] E. W. Berry, "The Flora of the Raritan Formation," *Bull. 3*, *Geol. Surv. of New Jersey*, 1911.

Obviously, if the Raritan failed to extend along the north shore of Long Island it was never represented on Martha's Vineyard, Block Island, or the Elizabeth Islands, and this is strikingly confirmed by the lithologic character of the Upper Cretaceous in the latter region and by the extensive flora, as has been recognized to a more or less degree by White, Ward, and Hollick, who have studied this flora. Of the 126 recorded species from Martha's Vineyard and Block Island only 36 are found in the Raritan. The number common to the Magothy is but 37, but these include a large number of forms that are distinctive horizon markers and range to higher levels in our southern states.

According to the age determinations as outlined above, the Raritan and Magothy floras are segregated in the following lists. These show that the Raritan flora comprises 224 and the Magothy flora 289 species (so called); 61 per cent of the Raritan flora does not extend into the Magothy and 70 per cent of the Magothy flora does not occur in the Raritan. A mere statistical method does not, however, sufficiently emphasize their contrasts. The Raritan contains a number of types that survived from the Lower Cretaceous, while the Magothy introduces many modern types in genera, among which the following may be mentioned:

- Amelanchier
- Araucaria
- Bumelia
- Coccolobites
- Crataegus
- Dalbergia
- Doryanthites
- Elaeodendron
- Guatteria
- Gyminda
- Hedera
- Illicium
- Lycopodium
- Marsilea
- Nectandra
- Nelumbo
- Ocotea
- Onoclea
- Paliurus
- Panax
- Periploca
- Persea
- Picea
- Pistia
- Planera
- Rhamnus
- Rhus
- Sabalites
- Viburnum
- Zizyphus

Only three of these genera are sparingly represented in the Raritan. It would hardly be worth while to follow the analysis farther in the present connection, as sufficient facts have already been given to establish the probability of the questions considered. Both Veatch and Fuller (*op. cit.*) consider that some of the north-shore outcrops represent the Raritan. Veatch, in discussing the underground waters of Long Island in 1906 (*op. cit.*) differentiated a horizon, the Lloyd sand, whose top is from 150 to 200 feet above bedrock. This sand, which may or may not be a continuous stratum, he believes he has identified in a considerable number of wells along both the north and south shores of Long Island and also in various records of wells in eastern New Jersey. He places it in the Raritan, but if it is really a continuous bed at the same stratigraphic level it probably represents the so-called laminated sands[1] formerly considered a part of the Raritan but shown by the writer to be lower Magothy[2].

Here follows lists of the plants identified from the Raritan and Magothy formations throughout their extent, which in the case of the latter is from Martha's Vineyard to the Potomac River valley, a distance along the strike of something like 450 miles (750 kilometers).

List of Plants Recorded from the Raritan Formation

Acer amboyense Newberry
Acer minutum Hollick
Acerates amboyense Berry
Andromeda grandifolia Berry
Andromeda Cookii Berry
Andromeda novae-caesareae Hollick
Andromeda Parlatorii Heer
Andromeda tenuinervis Lesquereux

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[1] *Final Rept. State Geologist, N.J.*, VI (1904), 168.

[2] *Ann. Rept. State Geol. N.J., for 1905*, p. 136.

Androvettia statenensis Hollick and Jeffrey
Anomaspis hispida Hollick and Jeffrey
Anomaspis tuberculata Hollick and Jeffrey
Aralia formosa Heer
Aralia groenlandica Heer
Aralia Newberryi Berry
Aralia patens Hollick
Aralia quinquepartita Lesquereux
Aralia rotundiloba Newberry
Aralia washingtoniana Berry
Aralia Wellingtoniana Lesquereux
Araliopsis breviloba Berry
Araliopsis cretacea (Newberry) Berry
Araliopsis cretacea dentata (Lesquereux) Berry
Araliopsis salisbureaefolia (Lesquereux) Berry
Araucariopitys americana Jeffrey
Araucarioxylon noveboracense Hollick and Jeffrey
Aspidiophyllum trilobatum Lesquereux
Asplenium Dicksonianum Heer
Asplenium Foersteri Debey and Ettingshausen
Asplenium jerseyensis Berry
Asplenium raritanensis Berry
Baiera incurvata Heer
Bauhinia cretacea Newberry
Bauhinia gigantea Newberry
Brachyoxylon notabile Hollick and Jeffrey
Brachyphyllum macrocarpum Newberry
Caesalpinia Cookiana Hollick
Caesalpinia raritanensis Berry
Calycites diospyriformis Newberry
Calycites parvus Newberry
Carpolithus euomymoides Hollick
Carpolithus floribundus Newberry
Carpolithus hirsutus Newberry
Carpolithus ovaeformis Newberry
Carpolithus pruniformis Newberry
Carpolithus vaccinioides Hollick
Carpolithus woodbridgensis Newberry
Celastrus arctica Heer
Celastrophyllum Brittonianum Hollick
Celastrophyllum crenatum Heer
Celastrophyllum cretaceum Lesquereux
Celastrophyllum decurrens Lesquereux
Celastrophyllum grandifolium Newberry
Celastrophyllum minus Hollick
Celastrophyllum Newberryanum Hollick
Celastrophyllum spatulatum Newberry
Celastrophyllum undulatum Newberry
Chondrites flexuosus Newberry
Chondrophyllum obovatum Newberry
Chondrophyllum orbiculatum Heer
Chondrophyllum reticulatum Hollick
Cinnamomum Newberryi Berry
Cissites formosus Heer
Cissites Newberryi Berry
Citrophyllum aligerum (Lesquereux) Berry
Cladophlebis socialis (Heer) Berry
Colutea primordialis Heer
Comptonia microphylla (Heer) Berry
Cordia apiculata (Newberry) Berry
Cornophyllum vetustum Newberry
Cycadinocarpus circularis Newberry
Cyparissidium gracile Heer?
Czekanowskia capillaris Newberry
Dactyolepis cryptomerioides Hollick and Jeffrey
Dammara borealis Heer
Dammara minor Hollick
Dalbergia apiculata Newberry
Dalbergia hyperborea Heer?
Dewalquea groenlandica Heer
Dewalquea insignis Hosius and v.d. Marck
Dewalquea trifoliata Newberry
Dicksonia groenlandica Heer
Diospyros apiculata Lesquereux?
Diospyros primaeva Heer
Diospyros amboyensis Berry
Diospyros vera Berry
Eucalyptus angusta Velenovsky
Eucalyptus attenuata Newberry
Eucalyptus Geinitzi Heer
Eucalpytus linearifolia Berry
Eucalyptus parvifolia Newberry
Eugeinitzia proxima Hollick and Jeffrey
Ficus daphnogenoides (Heer) Berry
Ficus Krausiana Heer
Ficus myricoides Hollick

Ficus ovatifolia Berry
Ficus Woolsoni Newberry
Fontainea grandifolia Newberry
Frenelopsis Hoheneggeri (Ett.) Schenk
Geinitzia formosa Heer
Geinitzia Reichenbachi Hollick and Jeffrey
Gleichenia Giesekiana Heer
Gleichenia micromera Heer
Gleichenia Zippei Heer
Hedera obliqua Newberry
Hedera primordialis Saporta
Hymenaea dakotana Lesquereux
Ilex amboyensis Berry
Ilex elongata Newberry
Juglans arctica Heer
Juglans crassipes Heer
Juniperus hypnoides Heer
Kalmia Brittoniana Hollick
Laurophyllum angustifolium Newberry
Laurophyllum elegans Hollick
Laurophyllum lancealatum Newberry
Laurophyllum minus Newberry
Laurophyllum nervillosum Hollick
Laurus nebrascensis Hollick
Laurus Hollae Heer?
Laurus plutonia Heer
Leguminosites atanensis Heer
Leguminosites coronilloides Heer
Leguminosites omphalobioides Lesquereux
Leguminosites raritanensis Berry
Liriodendron oblongifolium Newberry
Liriodendron primaevum Newberry
Liriodendron quercifolium Newberry
Liriodendropsis angustifolia Newberry
Liriodendropsis retusa (Heer) Newberry
Liriodendropsis simplex Newberry
Magnolia alternans Heer
Magnolia Hollicki Berry
Magnolia Isbergiana Heer
Magnolia Boulayana Lesquereux
Magnolia Lacoeana Lesquereux
Magnolia longipes Hollick
Magnolia Newberryi Berry
Magnolia speciosa Heer
Magnolia woodbridgensis Hollick
Majanthemophyllum pusillum Heer
Menispermites borealis Heer
Menispermites Wardianus Hollick
Microzamia gibba (Reuss) Corda
Moriconia cyclotoxon Debey and Ettingshausen
Myrica acuta Hollick
Myrica cinnamomifolia Newberry
Myrica Davisii Hollick
Myrica emarginata Heer
Myrica fenestrata Newberry
Myrica Hollicki Ward
Myrica Newberryana Hollick
Myrica raritanensis Hollick
Myrsine borealis Heer
Myrsine Gaudini (Lesquereux) Berry
Myrsine oblongata Hollick
Newberryana rigida (Newberry) Berry
Paliurus affinis Heer?
Passiflora antiqua Newberry
Phegopteris Grothiana Heer
Phaseolites elegans Hollick
Phyllites poinsettioides Hollick
Phyllites trapaformis Berry
Pinus granulata (Heer) Stopes
Pinus quinquefolia Hollick and Jeffrey
Pinus raritanensis Berry
Pinus tetraphylla Jeffrey
Pinus triphylla Hollick and Jeffrey
Pistacia aquehongensis Hollick
Pitoxylon statenense Hollick and Jeffrey
Planera Knowltoniana Hollick
Platanus aquehongensis Hollick
Platanus Heerii Lesquereux
Persoonia Lesquereuxii Knowlton
Persoonia spatulata Hollick
Phaseolites manhassettensis Hollick
Pityoidelepsis statensis Hollick and Jeffrey
Podozamites acuminatus Hollick
Podozamites Knowltoni Berry
Podozamites lanceolatus (L. and H.) F. Braun
Podozamites marginatus Heer
Populus harkeriana Lesquereux
Populus orbicularis (Newberry) Berry
Prepinus statenensis Jeffrey
Protodammara speciosa Hollick and Jeffrey

Protophyllocladus subintegrifolius (Lesq.) Berry
Protophyllum multinerve Lesquereux
Prunus ? acutifolia Newberry
Pseudogeinitzia sequoiiformis Hollick and Jeffrey
Pterospermites modestus Lesquereux
Pterospermites obovatus (Newberry) Berry
Quercus ? novae-caesareae Hollick ?
Quercus raritanensis Berry
Raritania gracilis (Newberry) Hollick and Jeffrey
Rhamnites minor Hollick
Salix flexuosa Newberry
Salix inaequalis Newberry
Salix Lesquereuxii Berry
Salix Newberryana Hollick
Salix pseudo-Hayei Berry
Salix raritanensis Berry
Sapindus Morrisoni Heer
Sassafras acutilobum Lesquereux
Sassafras hastatum Newberry
Sassafras progenitor Hollick
? Sequoia concinna Heer
Sequoia heterophylla Velenovsky
Sequoia Reichenbachi (Geinitz) Heer
Smilax raritanensis Berry
Sphaerites raritanensis Berry
Sphenaspis statenensis Hollick and Jeffrey
Strobilites Davisii Hollick and Jeffrey
Strobilites microsporophorus Hollick and Jeffrey
Tricalycites major Hollick
Tricalycites papyraceus Newberry
Tricarpellites striatus Newberry
Thuya cretacea (Heer) Newberry
Thuyites Meriana Heer
Viburnum integrifolium Newberry
Widdringtonites Reichii (Ettingshausen) Heer
Widdringtonites subtilis Heer
Williamsonia problematica (Newberry) Ward
Williamsonia Reesii Hollick
Williamsonia Smockii Newberry

List of Plants Recorded from the Magothy Formation

Acer paucidentatum Hollick
Amelanchier Whitei Hollick
Andromeda Cookii Berry
Andromeda grandifolia Berry
Andromeda novae-caesareae Hollick
Andromeda Parlatorii Heer
Aralia Brittoniana Berry
Aralia coriacea Velenovsky
Aralia Towneri Lesquereux
Aralia groenlandica Heer
Aralia mattewanensis Berry
Aralia nassauensis Hollick
Aralia Newberryi Berry
Aralia Ravniana Heer
Araucaria bladenensis Berry
Araucaria marylandica Berry
Araucarites ovatus Hollick
Araucarites Zeilleri Berry
Arisaema cretaceum Lesquereux
Arisaema (?) mattewanense Hollick
Asplenium cecilensis Berry
Algites americana Berry
Baiera grandis Heer ?
Banksia pusilla Velenovsky ?
Banksites Saportanus Velenovsky
Bauhinia marylandica Berry
Betulites populifolius Lesquereux
Brachyphyllum macrocarpum Newberry
Brachyphyllum macrocarpum formosum Berry
Bumelia praenuntia Berry
Calycites alatus Hollick
Calycites obovatus Hollick
Carix Clarkii Berry
Carpites liriophylli Lesquereux
Carpites minutulus Lesquereux
Carpolithus cliffwoodensis Berry
Carpolithus drupaeformis Berry
Carpolithus floribundus Newberry
Carpolithus hirsutus Newberry
Carpolithus juglandiformis Berry
Carpolithus mattewanensis Berry
Carpolithus ostryaeformis Berry
Carpolithus septloculus Berry

Cassia insularis Hollick
Ceanothus constrictus Hollick
Celastrus arctica Heer
Celastrophyllum crassipes Lesquereux?
Celastrophyllum crenatum Heer?
Celastrophyllum elegans Berry
Celastrophyllum grandifolium Newberry?
Celastrophyllum Newberryanum Hollick
Celastrophyllum undulatum Newberry?
Chondrites flexuosus Newberry?
Cinnamomum crassipetiolatum Hollick
Cinnamomum Heeri Lesquereux
Cinnamomum membranaceum (Lesquereux) Hollick
Cinnamomum Newberryi Berry
Cissites formosus magothiensis Berry
Cissites Newberryi Berry
Citrophyllum aligerum (Lesquereux) Berry
Coccolobites cretaceus Berry
Cocculus cinnamomeus Velenovsky
Cocculus imperfectus Hollick
Cocculus inquirendus Hollick
Cocculus minutus Hollick
Colutea obovata Berry
Confervites dubius Berry
Cordia apiculata (Newberry) Berry
Cornus cecilensis Berry
Cornus Forchhammeri Heer
Crataegus monmouthensis Berry
Credneria macrophylla Heer
Crotonophyllum cretaceum Velenovsky
Cunninghamites elegans (Corda) Endl.
Cunninghamites squamosus Heer
Cupressinoxylon Bibbinsi Knowlton
Czekanowskia dichtoma Heer?
Dalbergia irregularis Hollick
Dalbergia minor Hollick
Dalbergia severnensis Berry
Dammara borealis Heer
Dammara cliffwoodensis Hollick
Dammara minor Hollick
Dammara northportensis Hollick
Dewalquea groenlandica Heer
Diospyros apiculata Lesquereux?
Diospyros primaeva Heer
Diospyros prodromus Heer?
Diospyros provecta Velenovsky
Diospyros pseudoanceps Lesquereux
Diospyros rotundifolia Lesquereux
Doryanthites cretacea Berry
Dryandroides quiercinea Velenovsky
Elaeodendron marylandicum Berry
Elaeodendron strictum Hollick
Embothriopsis presagita Hollick
Eucalyptus (?) attenuata Newberry
Eucalyptus Geinitzi Heer
Eucalyptus Geinitzi propinqua Hollick
Eucalyptus latifolia Hollick
Eucalyptus linearifolia Berry
Eucalpytus Schubleri (Heer) Hollick?
Eucalyptus Wardiana Berry
Ficus atavina Heer
Ficus cecilensis Berry
Ficus crassipes Heer
Ficus daphnogenoides (Heer) Berry
Ficus Krausiana Heer
Ficus Krausiana subsimilis Hollick
Ficus myricoides Hollick
Ficus reticulata (Lesquereux) Knowlton
Ficus sapindifolia Hollick
Ficus Willisiana Hollick
Ficus Woolsoni Newberry
Frenelopsis Hoheneggeri (Ettingshausen) Schenk?
Geinitzia formosa Heer
Gleichenia delawarensis Berry
Gleichenia gracilis Heer?
Gleichenia protogaea Debey and Ettingshausen
Gleichenia Saundersii Berry
Gleichenia Zippei (Corda) Heer
Guatteria cretacea Hollick
Gyminda primordialis Hollick
Hedera cecilensis Berry
Hedera cretacea Lesquereux
Hedera simplex Hollick
Heterofilicites anceps Berry
Hymenaea dakotana Lesquereux
Hymenaea primigenia Saporta
Ilex papillosa Lesquereux
Ilex severnensis Berry
Ilex strangulata Lesquereux
Illicium deletoides Berry
Juglans arctica Heer
Juglans crassipes Heer

Juglans elongata Hollick
Juniperus hypnoides Heer
Laurophyllum angustifolium Newberry
Laurophyllum elegans Hollick
Laurophyllum lanceolatum Newberry
Laurophyllum ocoteaeoides Hollick
Laurus antecedens Lesquereux
Laurus atanensis Berry
Laurus Hollae Heer
Laurus Hollickii Berry
Laurus nebrascensis Lesquereux
Laurus Newberryana Hollick
Laurus plutonia Heer
Laurus proteaefolia Lesquereux
Laurus teliformis Lesquereux
Leguminosites canavalioides Berry
Leguminosites convolutus Lesquereux?
Leguminosites coronilloides Heer
Leguminosites omphaloboides Lesquereux
Ligustrum subtile Hollick
Liriodendron attenuatum Hollick
Liriodendron morganensis Berry
Liriodendron oblongifolium Newberry?
Liriodendropsis angustifolia Newberry
Liriodendropsis constricta Hollick
Liriodendropsis retusa (Heer) Hollick
Liriodendropsis simplex Newberry
Liriodendropsis spectabilis Hollick
Lycopodium cretaceum Berry
Magnolia amplifolia Heer
Magnolia Boulayana Lesquereux
Magnolia Capellinii Heer
Magnolia Hollicki Berry
Magnolia Isbergiana Heer
Magnolia Lacoeana Lesquereux
Magnolia longipes Hollick
Magnolia obtusata Heer
Magnolia pseudoacuminata Lesquereux
Magnolia speciosa Heer
Magnolia tenuifolia Lesquereux
Magnolia Van Ingeni Hollick
Magnolia woodbridgensis Newberry
Malapoenna falcifolia (Lesquereux) Knowlton
Marsilea Andersoni Hollick
Menispermites acutilobus Lesquereux?
Menispermites Brysoniana Hollick
Microzamia? dubia Berry
Moriconia americana Berry
Myrica Brittoniana Berry
Myrica cliffwoodensis Berry
Myrica longa Heer
Myrica Zenkeri (Ettingshausen) Velenovsky
Myrsine borealis Heer
Myrsine crassa Lesquereux
Myrsine Gaudini (Lesquereux)
Myrtophyllum sapindoides Hollick
Nectandra imperfecta Hollick
Nelumbo Kempii Hollick
Nelumbo primaeva Berry
Ocotea nassauensis Hollick
Onoclea inquirenda Hollick
Osmunda delawarensis Berry
Osmunda novae-caesareae Berry
Paliurus integrifolius Hollick
Paliurus populiferus Berry
Panax cretacea Heer
Periploca cretacea Hollick
Persea Leconteana Lesquereux
Persea valida Hollick
Phaseolites manhassettensis Hollick
Phragmites ? cliffwoodensis Berry
Phyllites cliffwoodensis Berry
Picea cliffwoodensis Berry
Pinus Andraei Coeymans?
Pinus delicatulus Berry
Pinus mattewanensis Berry
Pinus protoscleropitys Holden
Pitoxylon anomalum Holden
Pitoxylon foliosum Holden
Pitoxylon Hollicki Knowlton
Pistia Nordenskioldi (Heer) Berry
Planera betuloides Hollick
Platanus Kümmeli Berry
Podozamites Knowltoni Berry
Podozamites lanceolatus (L. and H.) F. Braun
Podozamites marginatus Heer
Populus stygia Heer
Populites tenuifolius Berry
Premnophyllum trigonum Velenovsky
Protodammara speciosa Hollick and Jeffrey
Protophyllocladus lobatus Berry

Protophyllocladus subintegrifolius (Lesquereux) Berry
Quercus eoprinoides Berry
Quercus Hollickii Berry
Quercus Holmesii Lesquereux
Quercus Morrisoniana Lesquereux
Quercus ? novae-caesareae Hollick
Quercus severnensis Berry
Quercus sp. Berry
Raritania gracilis (Newberry) Hollick and Jeffrey
Rhamnites apiculatus Lesquereux
Rhamnus inaequilateris Lesquereux
Rhamnus novae-caesareae Berry
Rhus cretacea Heer?
Sabalites magothiensis Berry
Sagenopteris variabilis Velenovsky
Salix fluexuosa Newberry
Salix Lesquereuxi Berry
Salix mattewanensis Berry
Salix meekii Newberry
Salix purpuroides Hollick
Sapindus apiculatus Velenovsky?
Sapindus imperfectus Hollick
Sapindus morrisoni Heer
Sapotacites Knowltoni Berry
Sassafras acutilobum Lesquereux
Sassafras angustilobum Hollick
Sassafras progenitor Newberry
Sequoia ambigua Heer
Sequoia concinna Heer
Sequoia fastigiata (Sternberg) Heer?
Sequoia gracilis Heer?
Sequoia heterophylla Velenovsky
Sequoia Reichenbachi (Geinitz) Heer
Smilax raritanensis Berry?
Sphaerites raritanensis Berry
Sterculia cliffwoodensis Berry
Sterculia minima Berry
Sterculia prelabrusca Hollick
Sterculia Snowii Lesquereux?
Sterculia Snowii bilobatum Berry
Sterculia sp. Hollick
Strobilites inquirendus Hollick
Strobilites perplexus Hollick
Thuja cretacea (Heer) Newberry
Thyrsopteris grevilliodes (Heer) Hollick
Tricalycites major Hollick
Tricalycites papyraceus Newberry
Tricarpellites striatus Newberry
Viburnum Hollickii Berry
Viburnum integrifolium Newberry
Viburnum mattewanensis Berry
Widdringtonites fasciculatus Hollick
Widdringtonites Reichii (Ettingshausen) Heer
Widdringtonites subtilis Heer
Williamsonia delawarensis Berry
Williamsonia marylandica Berry
Williamsonia problematica (Newberry) Ward
Zizyphus cliffwoodensis Berry
Zizyphus elegans Hollick
Zizyphus groenlandicus Heer
Zizyphus Lewisiana Hollick?
Zizyphus oblongus Hollick